

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

LISTING OF CLAIMS

Claims 1-11 (cancelled)

Claim 12 (currently amended) A method for removing a metallic layer from a surface of a ceramic substrate comprising the steps of:

immersing the ceramic substrate coated with the metallic layer in an acid solution comprising hydrochloric acid at a concentration of about 31% by volume of the solution for a time to substantially remove the metallic layer therefrom; and

annealing the ceramic substrate at a predetermined temperature sufficient to reduce pre-existing damage in the surface of the ceramic substrate by ~~The method of Claim 6, wherein the ramping step further comprises: the temperature using a heating ramp rate comprising:~~

heating to a first temperature of about 302°F at a first heating ramp rate of about 122°F/hour;

maintaining the first temperature for about an hour;

heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour;

heating to a third temperature of about 1652°F at a third heating ramp rate of about 347°F/hour;

maintaining the third temperature for about 7 hours; and

allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about minus 210°F/hour.

Claim 13 (currently amended) A method for removing a metallic layer from a surface of a ceramic substrate comprising the steps of:

immersing the ceramic substrate coated with the metallic layer in an acid solution comprising hydrochloric acid at a concentration of about 31% by volume of the solution for a time to substantially remove the metallic layer therefrom; and

annealing the ceramic substrate at a predetermined temperature sufficient to reduce pre-existing damage in the surface of the ceramic substrate by ~~The method of Claim 6, wherein the ramping step further comprises: the temperature at a heating ramp rate comprising:~~

heating to a first temperature of about 302°F at a first heating ramp rate of about 122°F/hour; and

maintaining the first temperature for about an hour.

Claim 14 (original) The method of Claim 13, wherein the ramping step further comprises:

heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour.

Claim 15 (original) The method of Claim 14, wherein the ramping step further comprises:

heating to a third temperature of about 1652°F at a third heating ramp rate of about 347°F/hour; and

maintaining the temperature for about 7 hours.

Claim 16 (original) The method of Claim 15, wherein the ramping step further comprises:

allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about minus 210°F/hour.

Claim 17 (currently amended) A method for removing a metallic layer from a surface of a ceramic substrate comprising the steps of:

immersing the ceramic substrate coated with a metallic layer comprising a composite layer formed from an aluminum coating in contact with the ceramic substrate and a tantalum deposition overlaying the aluminum coating in an acid solution of up to 31% hydrochloric acid by volume for a time to substantially remove the metallic layer therefrom; and

annealing the ceramic substrate at an elevated temperature sufficient to reduce pre-existing damage in the surface of the ceramic substrate through annealing by The method of Claim 7,
~~wherein the ramping step further comprises: the temperature at a heating ramp rate comprising:~~
heating to a first temperature of from about 302°F at a first heating ramp rate of about 122°F/hour;
maintaining the first temperature for about an hour;
heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour;
heating to a third temperature of about 1652°F at a third heating ramp rate of about 347°F/hour;
maintaining the third temperature for about 7 hours; and
allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about minus 210°F/hour.

Claim 18 (currently amended) A method for removing a metallic layer from a surface of a ceramic substrate comprising the steps of:

immersing the ceramic substrate coated with a metallic layer comprising a composite layer formed from an aluminum coating in contact with the ceramic substrate and a tantalum deposition overlaying the aluminum coating in an acid solution of up to 31% hydrochloric acid by volume for a time to substantially remove the metallic layer therefrom; and

annealing the ceramic substrate at an elevated temperature sufficient to reduce pre-existing damage in the surface of the ceramic substrate through annealing by The method of Claim 7,
~~wherein the ramping step further comprises: the temperature at a heating ramp rate comprising:~~
heating to a first temperature of about 302°F at a first heating ramp rate of about 122°F/hour; and
maintaining the first temperature for about an hour.

Claim 19 (original) The method of Claim 18, wherein the ramping step further comprises:

heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour.

Claim 20 (original) The method of Claim 19, wherein the ramping step further comprises:

heating to a third temperature of about 1652°F at a third heating ramp rate of about 347°F/hour; and

maintaining the temperature for about 7 hours.

Claim 21 (original) The method of Claim 20, wherein the ramping step farther comprises:

allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about minus 210°F/hour.

Claims 22-28 (cancelled)

Claim 29 (currently amended) A method for removing a metallic layer from a surface of a ceramic substrate comprising the steps of:

immersing the ceramic substrate coated with the metallic layer formed from one metal in an acid solution of up to 31% hydrochloric acid by volume for a time to remove a portion of the metallic layer therefrom; and

annealing the ceramic substrate subsequent to the immersion step at an elevated temperature sufficient to reduce pre-existing damage in the surface of the substrate by ~~The method of Claim 28, wherein the ramping step further comprises: the temperature at a heating ramp rate comprising:~~

heating to a first temperature of about 302°F at a first heating ramp rate of about 122°F/hour;

maintaining the first temperature for about an hour;

heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour;

heating to a third temperature of about 1652°F at a third heating ramp rate of about 347°F/hour;

maintaining the third temperature for about 7 hours; and

allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about minus 210°F/hour.

Claim 30 (currently amended) A method for removing a metallic layer from a surface of a ceramic substrate comprising the steps of:

immersing the ceramic substrate coated with the metallic layer formed from one metal in an acid solution of up to 31% hydrochloric acid by volume for a time to remove a portion of the metallic layer therefrom; and

annealing the ceramic substrate subsequent to the immersion step at an elevated temperature sufficient to reduce pre-existing damage in the surface of the substrate by ~~The method of Claim 28, wherein the ramping step further comprises:~~ the temperature at a heating ramp rate comprising:

heating to a first temperature of about 302°F at a first heating ramp rate of about 122°F/hour; and

maintaining the first temperature for about an hour.

Claim 31 (original) The method of Claim 30, wherein the ramping step further comprises:

heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour.

Claim 32 (original) The method of Claim 31, wherein the ramping step further comprises:

heating to a third temperature of about 1652°F at a third heating ramp rate of about 347°F/hour; and

maintaining the third temperature for about 7 hours.

Claim 33 (original) The method of Claim 32, wherein the ramping step further comprises:

allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about minus 210°F/hour.

Claims 34-36 (cancelled)

Claim 37 (currently amended) A method for removing a metallic layer from a surface of a ceramic substrate comprising the steps of:

immersing the ceramic substrate coated with the metallic layer formed from one metal in an acid solution comprising hydrochloric acid at a concentration of up to 31% by volume of the solution for a time to remove a portion of the metallic layer therefrom; and

annealing the ceramic substrate subsequent to the immersion step at an elevated temperature sufficient to reduce pre-existing damage in the surface of the substrate by ~~The method of Claim 36, wherein the ramping step further comprises:~~ the temperature at a heating ramp rate comprising:

heating to a first temperature of from about 302°F at a first heating ramp rate of about 122°F/hour;

maintaining the first temperature for about an hour;

heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour;

heating to a third temperature of about 1652°F at a third heating ramp rate of about 347°F/hour;

maintaining the third temperature for about 7 hours; and

allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about minus 210°F/hour.

Claim 38 (currently amended) A method for removing a metallic layer from a surface of a ceramic substrate comprising the steps of:

immersing the ceramic substrate coated with the metallic layer formed from one metal in an acid solution comprising hydrochloric acid at a concentration of up to 31% by volume of the solution for a time to remove a portion of the metallic layer therefrom; and

annealing the ceramic substrate subsequent to the immersion step at an elevated temperature sufficient to reduce pre-existing damage in the surface of the substrate by ~~The method of Claim 36, wherein the ramping step further comprises:~~ the temperature at a heating ramp rate comprising:

heating to a first temperature of about 302°F at a first heating ramp rate of about 122°F/hour; and

maintaining the temperature for about an hour.

Claim 39 (original) The method of Claim 38, wherein the ramping step further comprises:
heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour.

Claim 40 (original) The method of Claim 39, wherein the ramping step further comprises:
heating to a third temperature of about 1652°F at a third heating ramp rate of about 347°F/hour; and
maintaining the temperature for about 7 hours.

Claim 41 (original) The method of Claim 40, wherein the ramping step further comprises:
allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about minus 210°F/hour.

Claims 42-48 (cancelled)

Claim 49 (original) A method for refurbishing a deposition ring comprising a ceramic substrate coated with a metallic composite layer having an aluminum layer in contact with a surface of the ceramic substrate and a tantalum layer deposited over the aluminum layer comprising the steps of:

immersing the ceramic substrate coated with the metallic composite layer in a solution of up to 31% hydrochloric acid by volume for a time to remove a portion of the metallic layer therefrom;

removing the ceramic substrate from the acid solution;

rinsing the ceramic substrate in a rinse solution;

drying the substrate;

annealing the ceramic substrate at a predetermined temperature for a time to reduce damage or defects in the surface of the ceramic substrate by ramping step further comprises: the temperature at a heating ramp rate comprising:

heating to a first temperature of from about 302°F at a first heating ramp rate of about 122°F/hour;

maintaining the first temperature for about an hour;

heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour;

heating to a third temperature of about 1652°F at a third heating ramp rate of about 347°F/hour;

maintaining the third temperature for about 7 hours; and

allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about minus 210°F/hour; and

coating the ceramic substrate with a new metallic layer;

Claim 50 (original) A method for refurbishing a deposition ring comprising a ceramic substrate coated with a metallic composite layer having an aluminum layer in contact with a surface of the ceramic substrate and a tantalum layer deposited over the aluminum layer comprising the steps of:

immersing the ceramic substrate coated with the metallic composite layer in a solution of up to 31% hydrochloric acid by volume for a time to remove a portion of the metallic layer therefrom;

removing the ceramic substrate from the acid solution;

rinsing the ceramic substrate in a rinse solution;

drying the substrate;

annealing the ceramic substrate at a predetermined temperature for a time to reduce damage or defects in the surface of the ceramic substrate by ~~The method of Claim 48, wherein the ramping step further comprises:~~ the temperature at a heating ramp rate comprising:

heating to a first temperature of about 302°F at a first heating ramp rate of about 122°F/hour; and

maintaining the first temperature for about an hour; and

coating the ceramic substrate with a new metallic layer.

Claim 51 (original) The method of Claim 50, wherein the ramping step further comprises:

heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour.

Claim 52 (original) The method of Claim 51, wherein the ramping step further comprises:
heating to a third temperature of about 1652°F at a third heating ramp rate of about
347°F/hour; and
maintaining the third temperature for about 7 hours.

Claim 53 (original) The method of Claim 52, wherein the ramping step further comprises:
allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about
minus 210°F/hour.

Claim 54 (original) A method for refurbishing a deposition ring comprising a ceramic substrate coated with a metallic composite layer having an aluminum layer in contact with a surface of the ceramic substrate and a tantalum layer deposited over the aluminum layer comprising the steps of:

immersing the ceramic substrate coated with the composite layer in an acid solution of Claim 42, wherein the acid solution is of about 31 % HCl-hydrochloric acid for a time to remove a portion of the metallic layer therefrom;

removing the ceramic substrate from the acid solution;

rinsing the ceramic substrate in a rinse solution;

drying the substrate; and

coating the ceramic substrate with a new metallic layer.

Claims 55-57 (cancelled)

Claim 58 (original) A method for refurbishing a deposition ring comprising a ceramic substrate coated with a metallic composite layer having an aluminum layer in contact with a surface of the ceramic substrate and a tantalum layer deposited over the aluminum layer comprising the steps of:

immersing the ceramic substrate coated with the metallic composite layer in an acid solution including about 31% hydrochloric acid by volume for a sufficient time to substantially remove the metallic layer therefrom;

removing the ceramic substrate from the acid solution;
rinsing the ceramic substrate in a rinse solution;
drying the substrate;
annealing the ceramic substrate at a predetermined temperature for a time to reduce damage or defects in the surface of the ceramic substrate~~The method of Claim 57, wherein the~~ by
~~ramping step further comprises:~~ the temperature at a heating ramp rate comprising:
heating to a first temperature of from about 302°F at a first heating ramp rate of about 122°F/hour;
maintaining the first temperature for about an hour;
heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour;
heating to a third temperature of about 1652°F at a third heating ramp rate of about 347°F/hour;
maintaining the third temperature for about 7 hours; and
allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about minus 210°F/hour; and
coating the ceramic substrate with a new metallic layer.

Claim 59 (original) A method for refurbishing a deposition ring comprising a ceramic substrate coated with a metallic composite layer having an aluminum layer in contact with a surface of the ceramic substrate and a tantalum layer deposited over the aluminum layer comprising the steps of:

immersing the ceramic substrate coated with the metallic composite layer in an acid solution including about 31% hydrochloric acid by volume for a sufficient time to substantially remove the metallic layer therefrom;

removing the ceramic substrate from the acid solution;
rinsing the ceramic substrate in a rinse solution;
drying the substrate;
annealing the ceramic substrate at a predetermined temperature for a sufficient time to reduce damage or defects in the surface of the ceramic substrate by~~The method of Claim 57,~~
~~wherein the~~ ramping the temperature at a heating ramp rate comprising:~~step further comprises:~~

heating to a first temperature of about 302°F at a first heating ramp rate of about 122°F/hour; and

maintaining the first temperature for about an hour; and
coating the ceramic substrate with a new metallic layer.

Claim 60 (original) The method of Claim 59, wherein the ramping step further comprises:

heating to a second temperature of about 752°F at a second heating ramp rate of about 212°F/hour.

Claim 61 (original) The method of Claim 60, wherein the ramping step further comprises:

heating to a third temperature of about 1652°F at a third heating ramp rate of about 347°F/hour; and
maintaining the third temperature for about 7 hours.

Claim 62 (original) The method of Claim 61, wherein the ramping step further comprises:

allowing to cool to a fourth temperature of about 100°F at a cooling ramp rate of about minus 210°F/hour.